Changes to the Individual Variance made by the NCAAG[1]

The forerunner to the current Montana Nutrient Work Group was the Nutrient Criteria Affordability Advisory Group (NCAAG), which existed from September 2008 to April 2009 and met six times during that period. The NCAAG revised the individual variance process found in the 1995 EPA Interim Economic Guidance for Water Quality Standards (EPA Guidance) for situations where a variance was requested based on the 'substantial and widespread' economic impacts to a community.

The NCAAG developed new socio-economic indicators of a community's well-being, the 'Secondary' criteria of the Substantial test, to replace the original six Secondary indicators found in the EPA Guidance. Two of the indicators, median household income (MHI) and unemployment rate, were kept and remained largely unchanged from the original six. Four of the original six 'Secondary' indicators were dropped: 1) Bond Rating, 2) Overall Net Debt as Percent of Full Market Value of Taxable Property, 3) Property Tax Collection Rate and 4) Property Tax revenues as a percent of Full Market Value of Taxable Property) and replaced by three new indicators. The NCAAG-created five indicators of a community's health including the two original ones: (1) the community unemployment rate compared to the state rate, (4) the average community MHI compared to the state value, and three new ones (3) the community poverty rate, (4) a measure of low to medium income (LMI), and (5) a relative measure of how much the community is now paying in local fees and taxes compared to other Montana communities.

The reason for changing these indicators was to tailor the indicators of a community's well-being to Montana communities. The NCAAG felt that the original six indicators did not reflect the realities of local level financing or community health. Further detail about each indicator is found in the next section as well as other changes made to the individual variance process. The following major changes were made to the public individual variance process (for a community municipal system) from the 1995 EPA Guidance.

Substantial Impact-Municipal Household Screener Affordability Threshold

To the Municipal Household Screener percent of Median Household Income (MHI) measure within the 'Significant' test, the NCAAG added a Low to Medium Income Percentage Rate (LMI) Benchmark Comparison. In the original EPA Guidance Municipal Preliminary Screener, any town or community that could meet new water quality standards with users paying less than 1% MHI annually on average, was found to be able to afford the standard and was done with the

[1] Some of this comes from http://deq.mt.gov/wqinfo/nutrientworkgroup/AgendasMeetingsPresentations.mcpx Sept 16, 2010 minutes

analysis and denied a variance. Montana DEQ with advice from the Nutrient Work Group, allowed an exception to this rule where community that could meet new water quality standards with users paying less than 1% MHI annually on average to meet new water quality standards and a high LMI (defined currently as greater than 50% LMI) could move on to the next test in the variance process (the Secondary test with the five socioeconomic indicators). In other words, even if a town could meet new standards with less than 1% MHI on average (and thus did not pass the preliminary screener test), but had a high LMI as defined in the individual variance worksheet, then they could at least move on to the Secondary test. The reason is that a small number of communities may have income that is so skewed that a significant portion of the population would face substantial impacts from having to pay for additional treatment even though a community's MHI is high. An example is a resort town where 40% of households are wealthy (resulting in a higher MHI) and the remaining 60% are relatively poor (giving the town an MHI of, say, 53%) and may serve as the staff at the resort or at businesses in town. This change had no effect on MDEQ's final demonstration but was a provision that Montana stakeholders felt was important to include. Only a small handful of towns in Montana would likely fall under this exception.

Substantial Impacts--Secondary Indicators

The 'Median Household Income' indicator was kept as is in the original EPA Guidance and compared to the Montana average.

The 'Unemployment rate' indicator was kept as in the original EPA Guidance with one change. The NCAAG decided to use Montana's unemployment average as the comparison benchmark rather than the U.S. unemployment rate. The reason for this is that Montana's unemployment rate is often quite different from that of the U.S., and thus using the U.S. rate might skew the Secondary results.

The NCAAG dropped the 'Bond Rating' secondary indicator in the EPA Guidance. Most towns in Montana do not have a bond rating, due to their small size. MDEQ asked several towns over the phone about their bond rating, and most did not have one. The exception was the few larger towns in the state that do have a bond rating. Another concern was that Montana towns that do have a bond rating can increase their rating by buying insurance on it, and thus it might be misleading as a measure of community health. Finally, stakeholders early on in this process, including the City Manager of Helena at the time, felt that bond ratings were a poor measure of a community's financial health.

The NCAAG dropped the 'Overall Net Debt as Percent of Full Market Value of Taxable Property' indicator found in the EPA Guidance. The NCAAG did not think that it was a good measure of a municipality's financial health, because often a community's debt level had to do with either statutory requirements or other external factors not related to a town's financial health. Representatives for the City of Helena stressed the complications associated with this

financial indicator, highlighting that a city's debt often comes in three parts: 1) City debt; 2) Overlapping debt other than city; and 3) assessment structure debt. For these reasons, MDEQ with the NCAAG's advice, dropped this indicator.

The NCAAG dropped the 'Property Tax Collection Rate' indicator because it was considered not to be a good measure of community health. Collection rates in a town or county could be affected by large companies protesting their taxes, for example, as has happened repeatedly in Montana. Such a protest would have nothing to do with a town's financial health. Some of the larger electric utilities in Montana have protested their tax rates on dams and other large plants, affecting the tax collection rate in Montana counties like Cascade (which contains Great Falls) that have numerous large hydro dams. Even if the full tax is collected, it may be months or years after the initial tax period. Also, the property tax collection rate has proven to be a near impossible piece of data to collect for smaller towns and counties and thus would not be a reliable measure across all towns. To the extent that a town wanted to use a low tax collection rate as an argument for a variance, they could discuss that in the 'Widespread Impacts' section in the question that asks if "there is there any additional information that suggests that there are unique conditions in the affected community that should also be considered".

The NCAAG dropped the 'Property Tax revenues as a percent of Full Market Value of Taxable Property' for the reasons mentioned above. It was not considered by the NCAAG a good measure of community health and was also considered hard to collect in terms of time and effort. Also, various characteristics of towns could skew the results of this measure such as a town with numerous wealthy resorts (e.g. Whitefish) or a large industrial presence with respect to town size (Columbia Falls).

The NCAAG added the 'Low to Medium Income Percentage' indicator (LMI) to the Substantial Impacts. A household is considered to be within the LMI bracket if they are at or below 80% of the median family income for the county or for non-metropolitan areas of the state. The higher the LMI, the greater number of people who have low to medium income, and thus it is assumed the lower community financial health. The advisory committee felt that in addition to the other socio-economic measures including poverty rate, that LMI would be one of the best measures of community health and a good Secondary indicator.

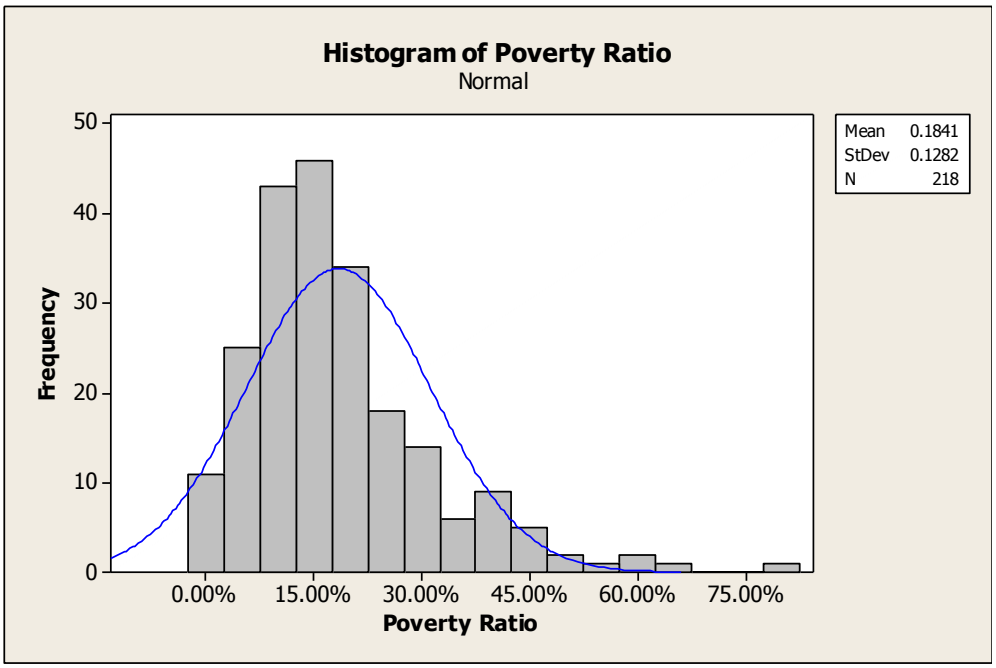
The NCAAG added the 'Poverty Rate' indicator to the Substantial Impacts section. In the EPA guidance, it was to be considered in Widespread Impacts, but instead, was felt to be a good determination of a community's health and thus a good Secondary Indicator. The NCAAG was determined to add as many income-type indicators as possible to assess a town's health over concern of lower average incomes in Montana. Poverty rate was suggested as a third indicator related to income along with MHI and LMI. Also, the poverty rate is a readily available statistic for most towns or the counties they reside in.

The NCAAG added a 'Property Tax, fees and revenues' indicator as the final added indicator to the Secondary score. This Property Tax, fees and revenues indicator takes a relative total of a community's local fees and taxes divided by MHI and indexed by population. This indicator

includes a summation of the following 1) General Government Activities-Program Revenues (Charges for Services): Fines, Forfeitures, including public works, safety, interest on debt and health, 2) Business Type Activities Program Revenues (Charges for Services): Hospital, water, sewer, solid waste, airport, business, and 3) local property taxes. This sum is then divided by the MHI of the given community and indexed to the community's population. This gives a relative measure of local taxes and fees to those paid by citizens in a given Montana town compared to other Montana towns. This indicator is aimed at how much financial latitude community members have to pay additional fees for system improvements. The rationale is that if a town is already paying a higher percentage of its income to local fees and taxes, then they may not have the ability to take on as much of an increase in wastewater fees as a town with lower percentage of its income going towards local fees and taxes.

Secondary Indicators: Determining Strong, Medium and Weak scores

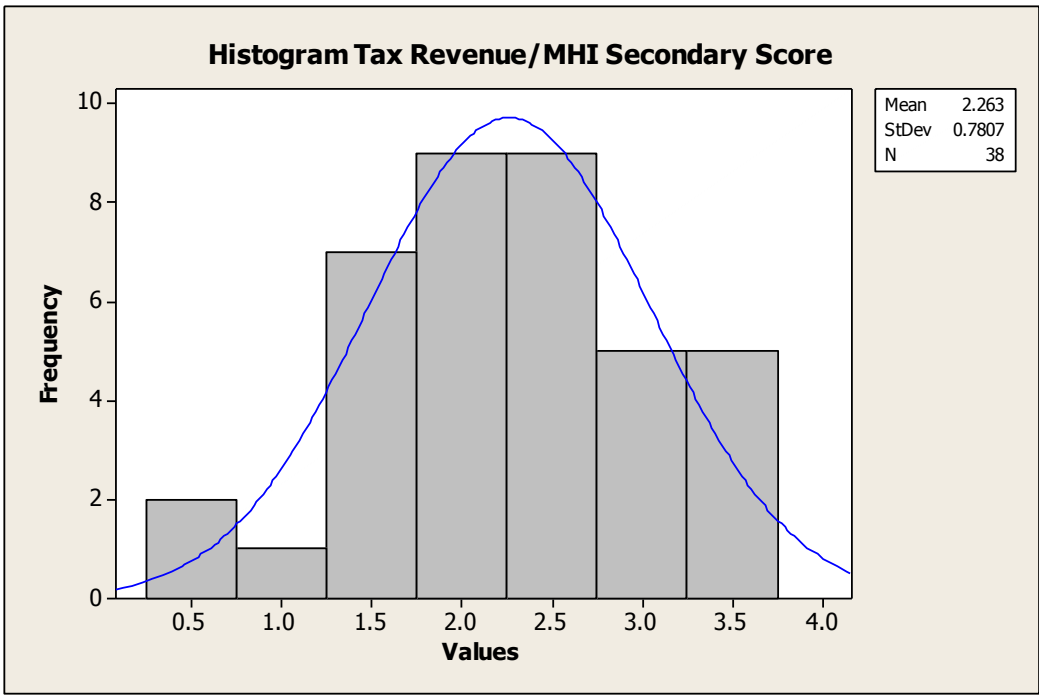
Absent clear guidance on how to assign strong, medium, and weak values for each of three new indicators, DEQ used histograms and statistical analysis. As an example, DEQ created a histogram of the poverty rates of all towns in Montana to visually come up with break points for a "weak", "mid-range", and "strong" score compared to the statewide Montana poverty rate benchmark to constitute calculating a secondary score. The figure below shows the histogram for Poverty Rates for all Montana towns in 2012. From this approximately normal distribution, the break points were selected both visually and using one standard deviation from the mean to define the breaks. It was felt that more than about one standard deviation away from the average poverty rate of all towns was enough to consider a town strong or weak in poverty, as most towns (approximately 68%) falls within one standard deviation. Visually, as well, the breaks selected have most towns falling within the medium category.



Using the standard deviation alone for the figure above, the break points would be 'less than 6%' poverty rate as a strong score and 'more than 31%' poverty rate as a weak score (rounded to the nearest whole number). This is done by subtracting or adding the standard deviation to the mean. However, we chose 9% and 24% as the break point because visually, that is where the majority of towns in Montana clustered and those numbers are more in line with high and low poverty rates in general. Clearly, high poverty rates rate a town as economically weak, and low rates rate a town as strong. Thus, a combination of statistical analysis and profession judgment were used for selecting those weak, medium and strong break points to calculate a Secondary score. Professional judgment became more important the more skewed the distributions were, as was the case in 2013 for Poverty Rate and LMI).

DEQ created a histogram of the LMI percentage rates of all towns in Montana in 2013 to come up with break points for a "weak", "mid-range", and "strong" score compared to the benchmark. In the case of break points for LMI, about 50% of the communities fall between the 25th and 75th percentiles (the interquartile range) and this was considered a medium score. A strong score was one below the 25th percentile (low LMI score) and a weak score was one above the 75th percentile. Note that this 'professional judgment' method of selecting break points was slightly different from the way it was done for poverty rates using a standard deviation, but the same result was that most towns fell within the medium category for LMI.

A histogram was also run on a sample of Montana towns for the Property Tax, fees and revenues indicator to determine break points. The breaks for high, medium and low were done mostly visually to approximate a normal distribution (see below) using 1.4 and 3.0 as break points and sticking to the standard deviation method (these numbers are index numbers with no literal meaning apart from the definition of the index—A higher number indicates a higher local fee and tax load). One standard deviation from the mean was used for creating those breaks and visual analysis confirmed this with a small rounding adjustment. Again, most towns fell within one standard deviation of the mean, and the outliers fell outside of that. The outliers clearly have a substantially higher or lower fee and tax burden than other towns. We could have divided a community's local fees and taxes by mean household income as opposed to median household income (MHI), but we used MHI as that was already available.



Assessment of Substantial Impacts Matrix

For the Assessment of Substantial Impacts Matrix found in the EPA Guidance, the question marks in the Matrix became 'X's. In other words, we gave those communities falling into the '?' zone (the uncertainty zone for Substantial impacts), the benefit of the doubt that they might experience Substantial impacts, and that they could move on to the Widespread test.

Widespread Impacts

DEQ changed the Widespread Impacts section to meet the needs of the NCAAG and NWG. The NCAAG and Nutrient Work Group suggested that the widespread impacts instructions in the EPA Guidance were too vague, too complicated, and included too many categories. The NWG wanted the Widespread Impacts section more objective and simple. The revised Widespread impacts section starts with several questions asking the respondent to define the impact area (which may be different than the community boundaries) and the present socio-economic conditions within that area. The next set of questions describes the changes to various socio-economic indicators that would result from meeting the new water quality standard. The socio-economic indicators considered include, 1) The economy in general; 2) Employment rates/jobs; 3) Poverty rates and social services; 4) Whether population levels would be affected; and 5) whether there would be widespread positive benefits from meeting the standards. If there would be widespread positive benefits from meeting the water quality standard, then that answer could offset negative widespread economic impacts.

Comparing Original and New Metrics

EPA asked DEQ to compare secondary scores for a sample of Montana towns using the revised five Secondary metrics compared to EPA's original six, to make sure our five metrics did not bias the Substantial test in favor of Montana towns. DEQ has secondary scores for over 20 Montana towns using the revised five Secondary indicators from the 2012 study DEQ did for EPA on Montana public WWTPs (i.e. the study that looked at why Montana WWTPs cannot afford currently to meet nutrient criteria). Unfortunately, four of the six original secondary measures in the EPA Guidance are almost impossible to collect, and such a comparison cannot be made as a result. For example, items like tax collection rate are not collected at the town level for most small towns, and some towns don't even have a bond rating.

The data for four of the original Secondary score metrics from the EPA Guidance (1995) are nearly impossible to collect. An effort in 2008 to collect data for these four metrics was largely unsuccessful, so it is very hard to compare the final Secondary scores from Montana's five metrics to what the scores would have with the original six metrics. Median Household Income and Unemployment rate were kept as they were easy enough to find at the town level (MHI) and country level (Unemployment rate). The data for the four metrics dropped might be relatively straightforward for the largest towns in Montana (e.g. bond rating was available for Helena), but not for the majority of towns in Montana including small towns. Having metrics for the largest seven towns only and not for the over 100 other towns affected would not allow us a comparison between the original and new indicators. The four metrics that are hard to collect data for are the four that DEQ dropped: 1) The Bond Rating of a town (only some Montana towns have bond ratings), 2) Overall Net Debt as Percent of Full Market Value of Taxable Property (considered a poor measure of town health), 3) Property Tax Revenues as a Percent of Full Market Value of Taxable Property (considered a poor measure of town health), and 4) Property Tax Collection Rate (most towns did not have this number). The following tables are provided with the sample towns and available data from the five metrics we settled upon for Montana.

Table C-3. Secondary Score Case Studies--Public WWTPs Actual Secondary Scores (2011)

	Poverty Rate	LMI	Unemployment rate	MHI	Tax Revenue	Total Average
Baker	2	2	3	3	2	2.4
Big Fork	3	3	1	2	N/A	2.25
Billings	2	2	3	2	2	2.2
Bozeman	2	2	3	2	2	2.2
Butte	2	2	2	1	3	2
Broadus	3	2	3	2	1	2.2
Circle	3	1	3	1	2	2
Columbia Falls	2	2	1	2	2	1.8
Cut Bank	1	2	1	2	2	1.6
Deer Lodge	2	2	1	2	3	2
Ekalaka	2	2	3	1	1	1.8
Ennis	2	2	2	1	2	1.8
Eureka	2	1	1	1	2	1.4
Froid	2	2	1	1	1	1.4
Fromberg	2	2	2	2	3	2.2
Glendive	2	2	3	2	2	2.2
Great Falls	2	2	2	2	2	2
Hamilton	1	2	1	1	1	1.2
Havre	2	2	2	2	2	2
Helena	2	2	3	3	2	2.4
Highwood	3	3	3	3	n/a	3
Ismay	3	3	3	1	3	2.6
Kalispell	2	2	1	2	2	1.8
Lewistown	2	2	3	1	2	2
Libby	2	2	1	1	1	1.4
Lima	2	1	3	1	2	1.8
Livingston	2	2	2	1	1	1.6
Lolo	2	2	2	2	n/a	2
Manhattan	2	2	2	3	2	2.2
Miles City	2	2	3	1	2	2
Missoula	2	2	2	1	2	1.8
Neihart	2	3	3	2	1	2.2
Phillipsburg	2	2	1	1	2	1.6
Plentywood	3	2	3	1	2	2.2
Red Lodge	2	2	2	3	2	2.2
Roundup	1	1	2	1	2	1.4
Shelby	2	2	3	2	2	2.2
Sidney	1	2	3	3	3	2.4
St. Ignatius	1	1	1	1	2	1.2
Stevensville	1	3	1	1	2	1.6
West Yellowstone	2	2	2	2	1	1.8

Table C-3. Secondary Score Case Studies--Public WWTPs Actual Secondary Scores with Original Six Metrics from EPA Guidance (2011)

	Bond Rating	Net Debt as %	Unemployment rate	MHI	Prop tax revenue %	Tax collect rate	Total Average
Baker	NA	NA	3	3	NA	NA	NA
Big Fork	NA	NA	1	2	NA	NA	NA
Billings	NA	NA	3	2	NA	NA	NA
Bozeman	NA	NA	3	2	NA	NA	NA
Butte	NA	NA	2	1	NA	NA	NA
Broadus	NA	NA	3	2	NA	NA	NA
Circle	NA	NA	3	1	NA	NA	NA
Columbia Falls	NA	NA	1	2	NA	NA	NA
Cut Bank	NA	NA	1	2	NA	NA	NA
Deer Lodge	NA	NA	1	2	NA	NA	NA
Ekalaka	NA	NA	3	1	NA	NA	NA
Ennis	NA	NA	2	1	NA	NA	NA
Eureka	NA	NA	1	1	NA	NA	NA
Froid	NA	NA	1	1	NA	NA	NA
Fromberg	NA	NA	2	2	NA	NA	NA
Glendive	NA	NA	3	2	NA	NA	NA
Great Falls	NA	NA	2	2	NA	NA	NA
Hamilton	NA	NA	1	1	NA	NA	NA
Havre	NA	NA	2	2	NA	NA	NA
Helena	AA rating	NA	3	3	NA	NA	NA
Highwood	NA	NA	3	3	NA	NA	NA
Ismay	NA	NA	3	1	NA	NA	NA
Kalispell	NA	NA	1	2	NA	NA	NA
Lewistown	NA	NA	3	1	NA	NA	NA

Libby	NA	NA	1	1	NA	NA	NA
Lima	NA	NA	3	1	NA	NA	NA
Livingston	NA	NA	2	1	NA	NA	NA
Lolo	NA	NA	2	2	NA	NA	NA
Manhattan	NA	NA	2	3	NA	NA	NA
Miles City	NA	NA	3	1	NA	NA	NA
Missoula	NA	NA	2	1	NA	NA	NA
Neihart	NA	NA	3	2	NA	NA	NA
Phillipsburg	NA	NA	1	1	NA	NA	NA
Plentywood	NA	NA	3	1	NA	NA	NA
Red Lodge	NA	NA	2	3	NA	NA	NA
Roundup	NA	NA	2	1	NA	NA	NA
Shelby	NA	NA	3	2	NA	NA	NA
Sidney	NA	NA	3	3	NA	NA	NA
St. Ignatius	NA	NA	1	1	NA	NA	NA
Stevensville	NA	NA	1	1	NA	NA	NA
West Yellowstone	NA	NA	2	2	NA	NA	NA